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AUTHOR Shashack, Willard F., Ed.
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ABSTRACT

The purpose of the handbook is to assist the school shop teacher in participating in voluntary compliance with the standards and regulations of the Occupational Safety and Health Act of 1970. The first major section deals with general shop safety and how the shop teacher can use the checklist to control possible safety violations in his shop. The following chapters are of a specific nature, with checklists to meet requirements for the common areas of vocational education: machine tool, welding, woodworking, electricity, automotive, and drafting. At the conclusion of the guide, there is a section dealing with general recordkeeping and accident reporting, a time table for implementation of safety standards, and a suggested instructional reference list. (Author/AJ)

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OCCUPATIONAL SAFETY AND HEALTH ACT

HANDBOOK FOR

VOCATIONAL AND TECHNICAL EDUCATION TEACHERS

(Prepared in Votec 399, Summer 1974)

July, 1974

Willard F. Shashack, Editor

Under the direction of Dr. Jacob Stern

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O S H A

HANDBOOK FOR VOCATIONAL AND TECHNICAL EDUCATION TEACHERS

Edited by

Willard F. Shashack

With contributions from the following individuals:

Patrick Duggan
Morton High School

Robert Fink
Danville Jr. College

David Garrison
Elk Grove High School

Allen N. Hornbrook
Paris High School

Andrew Lanum
Chicago, Kennedy-King College

Larry Leman
Berger-Kelley and Associates, Architects

Evert Levitt
Monticello High School

Douglas Lueck
Maroa-Forsyth High School

Alvin Wilcox
Danville Jr. College

Kenneth Wolf
Argenta-Oreana High School

Vocational and Technical Education 399 EE

Summer Term 1974

Dr. Jacob Stern

University of Illinois at Urbana-Champaign

College of Education

Department of Vocational and Technical Education

Urbana, Illinois

July 1974

O S H A

HANDBOOK FOR VOCATIONAL AND TECHNICAL EDUCATION TEACHERS

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PREFACE

You may have just become aware of a Federal Act that will have an important affect upon you and on conditions in your school shop. The new law is the Occupational Safety and Health Act of 1970.

The purpose of this Handbook, is to assist the school shop teacher in participating in a manner of voluntary compliance with O.S.H.A. standards, and creating an environment of safe and healthy conditions in the school shop. By exposing students to the O.S.H.A. standards at the high school level, they will be better prepared to deal with O.S.H.A. when they enter the labor force.

This Handbook does not propose to answer all questions that a teacher may encounter in meeting safety standards, but it does provide some of the most basic and important standards that O.S.H.A. has established.

The Handbook has several basic sections that will aid the teacher in his quest for a safe and healthy shop. The first major section deals with General Shop Safety, and how the shop teacher can use the check list to control possible safety violations in his shop. The following chapters are of a specific nature dealing with specific Vocational Education areas; these sections are to be used as a supplement to the General Safety Check List.

Final chapters of the handbook deal with: 1) a timetable for implementation--this section will aid the teacher in working to solve problems in an orderly fashion with the most critical areas of the school shop, 2) a record system--this section deals with the basic record keeping requirements of O.S.H.A. and finally, 3) suggested

references which will help the instructor in obtaining free and low cost safety instructional materials. The information in this Handbook draws heavily upon references that are listed in this section dealing with Suggested Instructional References.

Recognition is given to the class members of VOTEC 399 EE Summer term 1974 for contributions to this handbook, and to my wife, Pat, for her diligent work in proofreading of the initial copy of this handbook.

Appreciation is expressed to Dr. Jacob Stern for his assistance and guidance in the development of the handbook, and to Mr. James R. Glaze, Safety Officer at the University of Illinois.

It should also be noted that the information and recommendations contained in this publication have been compiled from sources believed to be reliable and to represent the best current opinion on the subject. No warranty, guarantee or representation is made by the authors of this handbook as to the absolute correctness or sufficiency of any representation contained in this handbook, and the authors assume no responsibility in connection therewith: nor can it be assumed that all acceptable safety measures are contained in this publication, or that other or additional measures may not be required under particular or exceptional conditions or circumstances. The foregoing is especially the case since:

1) The O.S.H.A. standards and guidelines themselves are constantly changing.

2) O.S.H.A. compliance officers vary considerably in terms of how they interpret the Act.

3) Every school shop situation provides an unique context for applying O.S.H.A. standards.

Willard F. Shashack, Editor

Willard F. Shashack
College of Education
Vocational and Technical
Education
July, 1974

To the Vocational Education Teacher,

Last year, more than 14,500 Americans were killed on the job. During the same period, over two million workers received disabling injuries. Another 400,000 sustained occupationally-induced illnesses.

It would be difficult to question the importance of safety education especially in light of these statistics. However, it is conceivable that many of these work-related fatalities, injuries and illnesses could have been avoided had the worker received safety training while in school.

To stem this rising tide of work-place injuries and illnesses, the William-Steiger Occupational Safety and Health Act of 1970 was passed. Heralded as the most significant piece of legislation since enactment of the Social Security Act, the National Labor Relations Act and the Fair Standards Act, it is designed "to assure so far as possible, every working man and woman in the Nation safe and healthful working conditions, and to preserve our human resources."

The U.S. Department of Labor, through the Occupational Safety and Health Administration (OSHA), is interested in alerting all employees and employers of their rights and responsibilities under this Act, and how to recognize, avoid and prevent occupational injuries and illnesses.

This Act provides a set of standards and regulations with which employers in the more than four million establishments covered by the Act must comply. Only by educating the public on the scope and need for these standards--and even more importantly, inculcating the willingness to observe them--can a safe and healthful workplace be realized.

Vocational education can play an extremely vital role in educating our young people. It will be the responsibility of the teacher to reach the young student in the school workshop. It is the purpose of this handbook to provide to the vocational education teacher a guide in meeting OSHA standards in his school shop. The Handbook includes an inspection check list of a general nature, as well as a check list to meet requirements for the common areas of vocational education. At the conclusion of this guide, there is a section dealing with general record keeping and accident reporting, a time table for implementation of safety standards, and a suggested instructional reference list.

Willard F. Shashack,
Editor

Background Information and Teacher Responsibilities

The intended purpose of this act is "to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources."

The provisions of the law apply to every employer engaged in a business affecting commerce who has employees. The law applies in all 50 states and all territories of the United States. Federal, state, and local employees are specifically excluded from coverage, but they may be covered by equally effective requirements.

Each employer under the act has the general duty to furnish each of his employees places of employment, free from recognized hazards causing, or likely to cause, death or serious physical harm; and the employer has the specific duty of complying with the safety and health standards under the act. Each employee has the duty to comply with these safety and health standards and all rules, regulations, and orders issued pursuant to the act which are applicable to his own actions and conduct.

Administration

The act took effect on April 28, 1971. Administration and enforcement of the act are vested primarily in the Secretary of Labor, and in a new agency, The Occupational Safety and Health Review Commission, a quasi-judicial board of three members appointed by the President. Research and related functions will, for the most part, be carried out by the new National Institute for Occupational Safety and Health established within HEW.

The Secretary of Labor is responsible for both promulgating and enforcing job safety and health standards. Occupational safety and health inspections will be made by inspectors located in offices to be established in many communities throughout the country.

In general, job safety and health standards consist of rules for avoidance of hazards which have been proven by research and experience to be harmful to personal safety and health. They constitute an extensive compilation of wisdom which sometimes applies to all employees.

Complaints of Violations

Any employees (or representative thereof) who believe that a violation of job safety or health standards exists which threatens physical harm, or that an imminent danger exists, may request an inspection by sending a signed notice to the Department of Labor. The notice must be specific in nature as to the grounds of complaint.

Enforcement

In enforcing the standards, Labor Department safety inspectors may enter without delay, and at any reasonable times, any establishment covered by the act to inspect the premises and all pertinent conditions, structures, machines, apparatus, devices, equipment and materials therein, and to question privately any employer, owner, operator, agent, or employee. The act permits the employer, and a representative authorized by his employees to accompany the inspector during the physical inspection of any workplace for the purpose of aiding such inspection. The Secretary of Labor also has power, in making inspections and investigations under the act, to require the attendance and testimony of witnesses and the production of evidence

under oath. The Secretary of Health, Education, and Welfare is also authorized to make inspections and question employers and employees in order to carry out those functions assigned to HEW under the act.

Where an investigation reveals a violation, the employer is issued a written citation describing the specific nature of the violation. All citations shall fix a reasonable time for abatement of the violation, and each citation issued by the Department must be prominently posted at, or near, each place where a violation referred to in the citation occurred. Notices, in lieu of citations, may be issued for violations which have no direct or immediate relationship to safety or health.

Notification of Proposed Penalty

Within a reasonable time after issuance of a citation for a job safety or health violation, the Labor Department shall notify the employer by certified mail of the penalty, if any, which is proposed to be assessed. The employer then has 15 working days within which to notify the Department that he wishes to contest the citation or proposed assessment of penalty. If the employer notifies the Department within such time that he does wish to contest the Secretary of Labor will so advise the Occupational Safety and Health Review Commission and the Commission shall afford an opportunity for a hearing. The commission then will issue orders affirming, modifying, or vacating the citation or proposed penalty.

Time for Abatement of Hazards

A citation issued by the Department shall prescribe a reasonable time for elimination or abatement of the hazard. This time limit may also be contested if notification of such is filed with the Department within 15 days. The time set by the Department for correcting a

violation shall not begin to run until there is a final order of the Review Commission, if the review is initiated by the employer in good faith and not solely for delay or avoidance of penalties.

Penalties for Violations

Willful or repeated violations of the Act's requirements by employers may incur monetary penalties of up to $10,000 for each violation. Citations issued for serious violations incur mandatory monetary penalties of up to $1,000 for each violation, while penalties in the same amount may be incurred where nonserious violations are cited. A serious violation exists where there is a substantial probability that death or serious physical harm could result. Any employer who fails to correct a violation for which a citation has been issued within the period prescribed therein may be penalized up to $1,000 each day the violation persists.

A willful violation by an employer which results in the death of any employee is punishable by a fine of up to $10,000 or imprisonment for up to 6 months. A second violation doubles these criminal penalties.

State Participation

Congress directed O.S.H.A. to encourage the states to develop and operate their own safety and health programs that must be "at least as effective as" the federal program.

Congress also provided funds through OSHA for the financing, planning, and operation of the state programs. OSHA has extended more than $9 million in planning grants to the states. In addition, as state plans are approved, OSHA pays 50 percent of the operating cost.

After a plan is approved, OSHA retains authority to enforce federal standards until it determines, on the basis of at least three years of

operation, that the state program is meeting all OSHA requirements. After that, the state operates the program.

Even then, OSHA's presence continues in two ways.

1. OSHA will inspect for any issues (standards) not covered by the state program.
2. OSHA will continue to monitor and evaluate the state's operation, and can withdraw approval if the plan is not being properly administered.

The Teacher and OSHA

Regulations promulgated under the authority of OSHA set forth detailed standards in respect to almost every conceivable activity. Some of the standards apply only to certain stated industries and are generally referred to as "vertical" standards. As an example, the construction industry has a specific set of standards with which it must comply. A school or its faculty would not normally be concerned with these special "vertical" standards. However, the Act does regulate a myriad of activities and situations which apply to all industries or occupations generally. These regulations are often referred to as "horizontal" standards, and are equally applicable to the activities of colleges, universities, schools and other professions and industries.

Until this point the penalties provided are for violations by an employer, and the logical question arises as to whether a member of the faculty of an educational institution is considered under any circumstances as an employer. Unfortunately, procedures under the Act have not been sufficiently developed so that an exact determination of who the responsible party would be in a criminal prosecution cannot be forecast. The imminent danger section of the act refers to "a workplace under your

ownership, operation, or control." Conceivably, therefore, the act could be interpreted to provide sanctions against a faculty member where the violation occurs in an area under the control of that faculty member.

An equally unanswerable question is whether an injury to a student could result in criminal sanctions under the Act. By its terms the Act is designed for the protection of employees and a strict construction would not include students in that category. However, until further judicial interpretation of the Act is made, these questions must at the present time remain unanswered.

The greatest significance of OSHA regulations for faculty members is in the area of civil actions for personal injuries where it is alleged that failure to comply with OSHA regulations constitutes negligence. Cases of this nature may arise where required protective devices are not provided on machinery used by students, or others, under the supervision of a faculty member. Other situations of potential liability may arise from failure to comply with standards as to individual protective equipment, chemicals, electrical apparatus or conceivably even as to housekeeping in classrooms or laboratories. It seems, therefore, that it would be to the advantage of teachers to familiarize himself with OSHA as well as other state and municipal regulations pertaining to instrumentalities and activities under his control.

The foregoing has been a somewhat quick approach to the subject of faculty liability. In summary, the faculty immunities of yesterday are fast disappearing, and the general rules of liability are increasingly applicable to members of the academic community. The present teacher must be aware of the fact that he is liable not only for his own acts or failures

to act, as the case may be, but in many cases may be personally responsible for the acts of failures to act of others who may be under his control or supervision.

Conclusion

This has been a summary of what the Occupational Safety and Health Administration is all about and how it operates.

As a teacher there is a great deal you can do in your classroom to impress upon young people the impact this Act has upon their future as a member of society.

Your participation in this worthwhile process is welcome and desired. Indeed, it is the purpose of this handbook.

CONDUCTING AN INSPECTION

INTRODUCTION:

A safe environment is an essential part of the school shop safety education program. The safe environment will exist only if hazards are discovered and corrected through regular and frequent inspections by school personnel, administrators, teachers and students. Safety inspections are to determine if everything is satisfactory.

Inspections may be made at the request of the board of education, the school administration or upon the initiative of the teacher. In any respect, the teacher will be responsible for satisfying OSHA standards and reporting to the proper school officials on recommendations for correcting violations.

This inspection check list should be used in any shop inspection, the inspector should then refer to the specific shop inspection lists contained in this handbook for a more strict procedure and items to be checked in a more specific manner.

DIRECTIONS:

When to Inspect: As a minimum, a safety inspection should be made at the beginning of every school term or semester. More frequent inspections may be advisable.

Who Inspects: This will depend upon local policies. It is recommended, however, that shop teachers, and students participate in making regular inspections. This not only tends to share responsibility but stimulates a broader interest in the maintenance of a safe school shop.

How to Inspect: Inspections should be well planned in advance.

1. Inspections should be systematic and thorough.

2. Inspections reports should be clear and concise but with sufficient explanation to make each recommendation for improvement understandable.

CHECKING PROCEDURE

Draw a circle around the appropriate letter using the following scheme:

D - De minimis - no direct or immediate relationship to job safety and health.

N - Nonserious violation - a violation that does have a direct relationship to job safety and health but would not cause death or serious injury.

S - Serious violation - a violation where there is substantial probability that death or serious physical harm could result.

I - Imminent danger - a condition where there is a reasonable certainty that a hazard exists that can be expected to cause death or serious physical harm immediately or before the hazard can be eliminated through regular procedures.

S+ - Satisfactory - no recommendation needed: situation in good condition.

PROCEDURE ON THE USE OF THE CHECKLIST FOR SHOP INSPECTIONS

STEP 1. Identify areas in your vocational program which are represented in this handbook.

		Applicable areas
I.	General Shop Inspection	X
II.	Autmotive	
III.	Drafting	
IV.	Electricity and Electronics	
V.	Foundry	
VI.	Graphic Communications	
VII.	Machine Tool	
VIII.	Sheet Metal	
IX.	Small Engines	
X.	Welding	
XI.	Woodworking	

STEP 2. Conduct Inspection: As you proceed through the check list, circle one of the items that applies to the particular situation. The categories are listed above.

STEP 3. Prepare Report Sheet: After the inspectior has been completed, complete the Report Sheet in the following manner.

1. List the code number of the item that is in violation, for example: a violation in the Automotive Shop would possibly look like this: II A 2, --this code would refer to a shop floor violation. The report sheet can be found at the rear of the General Shop Inspection List, page 23.

2. List the recommendation needed to correct the situation.

3. List violations in the following order.

   a. Imminent danger - to be corrected first
   b. Serious violation - to be corrected second
   c. Nonserious violation - to be corrected third
   d. De minimis violation - to be corrected fourth

STEP 4. After you have corrected the violation, indicate the date in which the required action was completed in the last column.

I. GENERAL SHOP INSPECTION

NAME OF SCHOOL SHOP: _____

INSPECTOR: _____

DATE: _____

A. GENERAL PHYSICAL CONDITION:

1. Machines, benches and other equipment are arranged so as to conform to good safety practices . . . . . D N S I S+

2. Condition of stairways. . . . . D N S I S+
   a. On stairways less than 44 inches wide having both sides enclosed, at least one handrail, preferably on the right side descending.

   b. A stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 34 inches nor less than 30 inches from upper service top rail to surface of tread in line with the face of riser at forward edge of tread.

   c. Loading capacity of handrails and brackets for handrails should be able to withstand 200 lbs.

   d. Fixed stairways shall be constructed to carry a load of five times the normal live load anticipated but never of less strength than to carry safely a moving concentrated load of 1000 lbs.

3. Condition of aisles and passageways . . . . . D N S I S+
   a. All places of employment, passageways, storerooms and service rooms shall be kept clean and orderly and in a sanitary condition.

   b. Permanent aisles and passageways shall be appropriately marked.

   c. It shall be unlawful to place or cause, or permit to be placed on any floor or roof of a building or other structure a load greater than that for which such floor or roof is approved by the building official.

4. Condition of floors . . . . . D N S I S+
   a. Floors of all buildings in which students work shall be maintained in a clean condition, and as far as possible, in a dry condition, consistent with the type of operation carried on.

b. To facilitate cleaning, every floor, working place and passageway shall be kept free from protruding nails, splinters, holes, or loose boards.

5. Condition of walls, windows, and ceiling . . . . . D N S I S+

6. Illumination is safe, sufficient and well placed . D N S I S+
   a. For most manufacturing operations 30 to 50 foot candles.

   b. For most office and clerical work 100 to 200 foot candles. Taken at the surface level of the work.

7. Ventilation is adequate and proper for conditions . D N S I S+
   a. All work rooms in which students regularly work...shall have not less than 2000 cubic feet of air space per person regularly based on gross cubical contents, provided the total projected area of doors and windows opening to the out-of-doors is not less than 12 ½ per-cent of the gross floor area of the work room.

8. Temperature control . . . . . D N S I S+

9. Fire extinguishers are of proper type, adequately supplied, properly located and maintained . . . . . D N S I S+
   a. Have all water or soda acid extinguishers located near electrical equipment been removed?

   b. Have all carbon tetrachoride extinguishers been eliminated?

   c. Are all extinguishers weighing 40 lbs. or more installed so that the top of the extinguishers is less than 5 feet above the floor?

   d. Are all water extinguishers located outdoors during the winter equipped with nonfreezing agents?

   e. Can you walk less than 75 feet to find fire extinguishers in the work area?

   f. Do extinguishers have an inspection tag indicating monthly defect checks?

10. Teachers and pupils know location of and how to use proper extinguishers for various fires . . . . . D N S I S+

11. Number and location of exits is adequate and properly identified . . . . . D N S I S+
    a. Do all exits exceed 44 inches in width?

b. Are exit signs with at least 5 foot candles of illumination provided?

c. Is the exit illumination on the schools emergency power supply?

d. Do all exit doors which are kept locked have panic devices?

e. Are all areas including basements provided with two or more means of exit?

12. Have proper procedures been formulated for emptying the room of pupils and taking adequate precautions in case of emergencies? . . . . . D N S I S+

13. Lockers inspected regularly for cleanliness and fire hazards . . . . . D N S I S+

14. Lockers are kept closed . . . . . D N S I S+

15. Walls are clear of objects that might fall . . . . . D N S I S+

16. Do teachers know the procedure in the event of fire including notification of the fire department and evacuation plan? . . . . . D N S I S+

17. _____ D N S I S+

18. _____ D N S I S+

19. _____ D N S I S+

20. Evaluation for the total rating of (A) GENERAL PHYSICAL CONDITION . . . . . D N S I S+

B. HOUSEKEEPING

1. General appearance as to orderliness . . . . . D N S I S+

2. Adequate and proper storage space for tools and materials . . . . . D N S I S+

3. Benches are kept orderly . . . . . D N S I S+

4. Corners are clean and clear . . . . . D N S I S+

5. Special tool racks in orderly condition, and provided at benches and machines . . . . . D N S I S+

6. Tool, supply and/or material room is orderly . . . . D N S I S+

7. Sufficient scrap boxes are provided . . . . . D N S I S+

8. Scrap stock is put in scrap boxes promptly . . . . . D N S I S+

9. Materials are stored in an orderly and safe condition . . . . . D N S I S+

10. A spring lid metal container is provided for waste and oily rags . . . . . D N S I S+

11. All waste materials and oily rags are promptly placed in the containers . . . . . D N S I S+

12. Containers for oily rags and waste materials are frequently and regularly emptied . . . . . D N S I S+

13. Dangerous materials are stored in metal cabinets . D N S I S+
    a. Are all flammables within the work area stored in UP approved 5 gallon or less safety cans?

14. Equipment has been color conditioned . . . . . D N S I S+
    a. RED - Fire protection equipment and apparatus Safety cans, Stop equipment.

    b. ORANGE - Designating dangerous parts of machines.

    c. YELLOW - Designating caution and marking physical hazards.

    d. GREEN - Designating "Safety and First Aid Equipment."

    e. BLUE - Caution against starting equipment that is being repaired.

    f. BLACK, WHITE or COMBINATION - Traffic and housekeeping.

    g. PURPLE - Basic danger of radiation.

15. Bulk storage of dangerous material is provided outside of the main building . . . . . D N S I S+
    a. Do you have a written procedure that requires that not more than 25 gallons of flammable liquid shall not be stored outside of a storage cabinet or storage room?

    b. Are outside flammable storage areas enclosed or otherwise protected from heat and mobile equipment exposure?

    c. Are 55 gallon drums used for dispensing flammables equipped with flame arrestors and are the drums grounded?

16. A toe-board or railing around a mezzannine used for storage or washing facilities . . . . . D N S I S+

17. Flammable liquids are not used for cleaning purposes . . . . . D N S I S+

18. Floors are free of oil, water and foreign material . D N S I S+

19. _____ D N S I S+

20. _____ D N S I S+

21. _____ D N S I S+

22. Evaluation for the total rating for (B) HOUSE KEEPING . . . . . D N S I S+

C. EQUIPMENT

1. Machines are arranged so that workers are protected from hazards of other machines, passing students, etc. . . . . D N S I S+

2. Danger zones are properly indicated and guarded . . D N S I S+

3. All gears, moving belts, etc., are protected by permanent enclosure guards . . . . . D N S I S+
   a. Each of the following motions can produce a crushing or shearing action. Are they guarded?
      1) Rotary motion, example: flywheels, pulleys, belts, screws.
      2) Reciprocating motion, example: shears, rams, shapers, presses, etc.

4. All equipment control switches are easily available to operator . . . . . D N S I S+

5. All machines are "locked off" when instructor is out of room . . . . . D N S I S+

6. Brushes are used for cleaning equipment . . . . . D N S I S+

7. Nonskid areas are provided around machines . . . . . D N S I S+

8. Machines are in safe working condition . . . . . D N S I S+

9. Adequate supervision is maintained when students are using machines and dangerous tools . . . . . D N S I S+

10. Tools are kept sharp, clean and in safe working order . . . . . D N S I S+

11. All hoisting devices are in safe operating condition . . . . . D N S I S+

a. Do you have an inspection plan with records to indicate monthly and yearly inspections for control mechanisms, safety devices, rope deterioration, sleeve wear, etc.?

b. Are all hooks equipped with safety latches?

c. Do all cables have the required number of clamps and U-bolt spacing?

d. Are weight limits posted on the lifting device and lift supports?

12. Machines are shut off while unattended . . . . . D N S I S+

13. Adequate storage facilities for tools, equipment, etc., not in immediate use . . . . . D N S I S+

14. _____ D N S I S+

15. Evaluation for the total rating for (C) EQUIPMENT . D N S I S+

D. PERSONAL PROTECTION

1. Goggles or protective shields are provided and required for all work where eye hazards exist . . . . . D N S I S+

2. If individual goggles are not provided, hoods and goggles are properly disinfected before use. . . . . D N S I S+
   a. Do you have an inspection and replacement system established to detect and replace pitted or scratched lenses?

3. Shields and goggles are provided for electric welding . . . . . D N S I S+

4. Rings and other jewelry are removed by pupils when working in the shop . . . . . D N S I S+

5. Proper kind of wearing apparel is worn and worn properly for the job being done . . . . . D N S I S+

6. Leggings, safety shoes, etc., are worn in special classes such as foundry, etc. when needed . . . . . D N S I S+

7. Respirators are provided for dusty or toxic atmospheric conditions such as when spraying in the finishing room . . . . . D N S I S+

8. Provisions are made for cleaning and sterilizing respirators . . . . . D N S I S+

9. Sleeves are rolled above elbows when operating machines . . . . . D N S I S+

10. Clothing of students is free from loose sleeves, flopping ties, loose coats, etc . . . . . D N S I S+

11. Skin guards are provided, hard hats, aprons, gloves, sleeves, etc. where there are hazards of environmental, chemical, radiological or mechanical irritants in a manner capable of causing injury or impairment of any part of the body through absorption or physical contact . . . . . D N S I S+

12. Do you provide personal ear protection equipment and a sound testing program where engineering controls have failed to reduce noise levels below 90 dB? . . . . . D N S I S+

13. _____ D N S I S+

14. _____ D N S I S+

15. _____ D N S I S+

16. Evaluation for the total rating for (D) PERSONAL PROTECTION . . . . . D N S I S+

E. ACCIDENT RECORDS

1. There is a written statement outlining the proper procedure when and if a student is seriously hurt . D N S I S+

2. Adequate accident statistics are kept . . . . . D N S I S+

a. Are OSHA posters predominantly displayed?

b. Are you using OSHA forms 100, 101, and 102 for records on accident and health exposures?

c. Do you have a written accident investigation procedure?

d. Do you have a written hazard inspection procedure and is there evidence it has been followed in the past 30 days?

e. Do you have a written housekeeping plan or procedure and is there evidence it has been followed in the past 30 days?

f. Do you have a safety committee and is there evidence of any results of that committee in the past 30 days?

g. Do you have any evidence to show training education or student relations activity to keep students aware of the best safety and health practices at your shop?

3. Accidents are reported to the proper administrative authority by the instructor . . . . . D N S I S+

4. A copy of each accident report is filed with the Board of Education . . . . . D N S I S+

5. Accident reports are analyzed for instructional purposes and to furnish the basis for elimination of hazards . . . . . D N S I S+

6. _____ D N S I S+

7. _____ D N S I S+

8. _____ D N S I S+

9. Evaluation for the total rating of (E) ACCIDENT RECORDS . . . . . D N S I S+

F. FIRST AID

1. The school shall ensure the ready availability of medical personnel for advice and consultation on matters of school health . . . . . D N S I S+

2. In the absence of an infirmary, clinic, or hospital in near proximity to the workplace, which is used for the treatment of all injured students, a person or persons shall be adequately trained to render first aid. First aid supplies approved by the consulting physician shall be readily available . . . . D N S I S+

3. Where the eyes or body of any person may be exposed to injurious corrosive materials suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use . . . . . D N S I S+

4. _____ D N S I S+

5. _____ D N S I S+

6. Evaluation for the total rating of (F) FIRST AID . . D N S I S+

G. INSTRUCTION

In considering the types of responses needed for the categories in this area, you should mark your findings as satisfactory (S) or unsatisfactory (U).

1. Shop Safety is taught as an integral part of each teaching unit . . . . . S U

2. Safety rules are posted particularly at each danger station . . . . . S U

3. Printed safety rules are given each student . . . . . S U

4. Use of safety inspector . . . . . S U

5. Use of a student shop safety committee . . . . . S U

6. Use of safety contests . . . . . S U

7. Motion and/or slide films on safety are used in the instruction . . . . . S U

8. Use of suggestion box . . . . . S U

9. Use of safety tests . . . . . S U

10. Use of safety posters . . . . . S U

11. Talks on safety are given to the classes by industrial men . . . . . S U

12. Tours are taken of industrial plants as a means of studying safety practices . . . . . S U

13. Periodic safety inspections of the shop are made by a student committee . . . . . S U

14. Men from industry make safety inspections of the shop . S U

15. Student shop safety committee investigates all accidents . . . . . S U

16. A proper record is kept of safety instructions which are given preferably showing the signature of student on tests given in this area . . . . . S U

17. Rotate students on the Shop Safety Committee so that as many students as possible have an opportunity to participate . . . . . S U

18. _____ S U

19. _____ .S U

20. Evaluation for the total rating of (G) INSTRUCTION S U

H. ELECTRICAL INSTALLATION

Electrocution and Ignition/Explosion are the two hazards associated with electricity. Electrical safety is the provision of adequate

safeguards to avoid these hazards and to protect people, buildings and their contents. The basics of these safeguards can be expressed with the following statements.

1. Ground everything that might accidentally become energized.
2. Keep electricity separated from what isn't to be electrified.
3. Keep heat and sparks from electrical conditions and equipment from starting a fire or triggering an explosion.
4. Don't assume safety; electrical equipment is dangerous until made or proven safe.

Three of these basic rules are expanded with practical directions for applications in the 1971 National Electrical Code published by the National Fire Protection Association, Boston, Mass. 02210 and is available for $3.50. The book has been updated every 3 years since 1911 and the next edition will be available in September 1974. The requirements of OSHA for electrical safety (1910.309) are those of the National Electrical Code and apply to all new installations or a replacement modification or repair of an installation after March 15, 1972. The fourth statement listed above is an attitude, and depends on you. Don't take anything for granted: check if you're not sure and be sure only after checking.

Electrical Safety Courses are available from the Measurements and Data Society of America, 1687 Washington Road, Pittsburgh, Pa. 15228 at the low cost of $2.00 each.

1. All switches are enclosed . . . . . D N S I S+
2. There is a master control for all of the electrical installations . . . . . D N S I S+
3. Electrical outlets and circuits are properly identified . . . . . D N S I S+
   a. Is the voltage and intended use of switches, circuit breakers, and other electrical control devices clearly posted on each device?

4. All electrical extension cords are in safe condition and are not carrying excessive loads . . . . . D N S I S+

5. All machine switches are within easy reach of operators . . . . . D N S I S+

6. Individual cut-off switches are provided for each machine . . . . . D N S I S+

7. Machines are provided with overload and underload controls by magnetic pushbutton controls . . . . . D N S I S+

8. No temporary wiring in evidence. . . . . D N S I S+

9. All switches or other electrical gear carrying between 50 to 600 volts enclosed or grounded . . . . . D N S I S+

10. Storage of materials within transformer vaults prohibited . . . . . D N S I S+

11. Evaluation for the total rating of (H) ELECTRICAL INSTALLATION . . . . . D N S I S+

	REPORT SHEET					
Code No.	Recommendations	Type of violations I	S	N	D	Date Completed

II. AUTOMOTIVE SHOP

A. SHOP FLOOR

1. The shop floor should have an industrial approved concrete sealer which prevents absorption of oil, solvents and fuels . . . . . D N S I S

2. The floor should have anti-skid area around wash stands and solvent tanks . . . . . D N S I S

B. SHOP VENTILATION

1. Adequate ventilation is provided for the dissipation of exhaust gasses of small engines and welding gas fumes . . . . . D N S I S

2. Exhaust hoses are provided to carry automative exhaust outside of the shop. . . . . D N S I S

3. Adequate ventilation is provided for those areas where solvents and toxic materials are stored . . . D N S I S

C. MACHINING EQUIPMENT

1. Face guards are provided where grinding wheels and wire wheels are being used . . . . . D N S I S

2. Machines properly grounded . . . . . D N S I S

3. Machines properly fastened to work benches or stands . . . . . D N S I S

D. DANGEROUS LIQUIDS

1. All containers for battery acid, fuel, and solvents are properly marked and OSHA approved . . . D N S I S

2. These liquids are stored in a well-ventilated area and are away from sparks or open flames . . . D N S I S

E. AUTOMOTIVE LIFTS

1. Hydraulic lifts are provided with safety stops to prevent the lift from collapsing . . . . . D N S I S

F. ADEQUATE LIGHTING

1. The shop lighting is such that measuring instruments and machining operations can be seen clearly and without glare . . . . . D N S I S

III. CHECKLIST FOR DRAFTING ROOM SAFETY

A. GENERAL

1. Provide safety education as an integral part of drafting training . . . . . D N S I S+

2. Maintain a rotation, clean-up and safety program with individual assignments of specific duties . . . D N S I S+

3. Provide for proper functioning and operation of audio-visual and instructional aid equipment . . . D N S I S+

4. All equipment used by students, must be kept in a safe and useful working condition . . . . . D N S I S+

5. Pencil points shall not have excessively sharp tips. Sharp tips on pencils can puncture paper as well as break off and strike someone in the eye . . . . . D N S I S+

6. Sharpen pencils on one end only . . . . . D N S I S+

7. Keep pointed objects, such as pencil points out of the mouth and ears . . . . . D N S I S+

8. Sharp tools such as compass points, dividers, scissors, and pencil points shall be laid in positions out of the way and out of danger to someone else when not in use . . . . . D N S I S+

9. Sharp tools must be handled and used very carefully when passing or carrying from one position to another . . . . . D N S I S+

10. Remove items, such as: waste paper, tape, pencils, erasers, thumb tacks, etc., from the floor and put in their appropriate places . . . . . D N S I S+

11. Drawers in drafting tables and file cabinets should be kept closed at all times to avoid falls . . . . . D N S I S+

12. Fasten file cabinets to avoid tipping when only top drawers are open . . . . . D N S I S+

13. Maintain proper usage and spring tension on all paper cutters, including scissors . . . . . D N S I S+

14. Avoid placing fingers into openings of machines where paper is normally fed . . . . . D N S I S+

15. All equipment when not in use must have a specific allotted space for storage . . . . . D N S I S+

16. Students should not lean back or tilt stools or chairs . . . . . D N S I S+

17. Provide nonskid tips on drafting stools to prevent slipping on slick floor surfaces . . . . . D N S I S+

18. When not using the drafting stool, push stool under the drafting table to maintain an unobstructed traffic flow pattern . . . . . D N S I S+

19. Recognize the inherent dangers of the reproduction equipment . . . . . D N S I S+
    a. Instruct students to proper equipment usage.

    b. Provide a mechanically controlled exhaust system for ventilation of ammonia vapors.

    c. Follow manufacturers advice on the storage and handling of ammonia.

    d. Always shut-off master power switch when cleaning or maintaining the reproduction machine or bulb.

20. Adjust drafting board and stool per individual student to attain comfortable drafting position . D N S I S+

21. Raise and lower drafting board tops to avoid pinching of fingers and hands . . . . . D N S I S+

22. Work at the drafting board in a position that does not endanger your elbow. Excessive leaning on one elbow can cause inflammation of the bursa or bursitis . . . . . D N S I S+

23. Never overcrowd a drafting room . . . . . D N S I S+
    a. Too many individuals can cause horseplay which generally results in accidents. The recommended capacity of a drafting room, according to the State of Illinois, Efficient and Adequate Standards for the Construction of Schools, is one (1) student for every 50 square feet of floor space.

24. Arrange the drafting room to provide traffic areas separate from work areas . . . . . D N S I S+

25. Provide aisles, working spaces, and direct exiting of a minimum 36 inch width, functional to the physically handicapped . . . . . D N S I S+

26. The temperature of the drafting room should be maintained at an optimum level for each particular season of the year . . . . . D N S I S+

a. Room temperature is measured at the center of the room, 5 feet above the floor.

Summer - 72°
Fall - 74°
Winter - 76°
Spring - 74°

NOTE: Due to the varying conditions of building construction and the humidity these temp. may vary ± 5° F.

27. Avoid eyestrain - never work continuously at the drafting board without taking an occasional short break . . . . . D N S I S+

28. Avoid shadows and bright sunlight for sources of illumination . . . . . D N S I S+

29. Reflect artificial light, when such light is required . . . . . D N S I S+

30. During school hours, maintain unrestricted exit pathways from the building . . . . . D N S I S+

31. For proper fire protection and smoke stop separation, doors with closers should not be propped open. However in the case where the door closer has a hold-open device it is permitted to maintain the door in an open position . . . . . D N S I S+

32. No furnishings, decorations, wall coverings, paintings, etc. shall be used which are of a highly flammable character or which in the amounts used, will endanger egress due to rapid spread of fire or formation of heavy smoke or toxic gasses . . . . . D N S I S+

IV. SAFETY IN ELECTRONICS AND ELECTRICITY SHOPS

A. GROUNDING: ARTICLE 250 NEC.

1. All outlets have a safety ground . . . . . D N S I S+

2. Safety grommets intact with less than 5% voltage drop with rated current . . . . . D N S I S+

3. Frames of electrical machinery grounded . . . . . D N S I S+

4. Neutral is connected to ground at the main service panel . . . . . D N S I S+

5. The grounding conductor and the neutral conductor run separately throughout the building . . . . . D N S I S+

6. All neutrals are identified with a W or WH . . . . . D N S I S+

B. SEPARATION

1. All energized conductors are in conduit, walls, boxes and panels placed so that no possibility of a dangerous current can occur . . . . . D N S I S+

2. Insulation is adequate for voltage and temp. . . . . D N S I S+

3. All hot wires are clear of combustible material . . D N S I S+

4. In hazardous locations, all arcing contacts are enclosed in explosion proof boxes . . . . . D N S I S+

C. OVER CURRENT PROTECTION 240 NEC.

1. Amp capacities of wires are (table 310-20 NEC) adequate . . . . . D N S I S+

2. Circuits are fused according to their capacities . D N S I S+

D. GROUNDFAULT

1. Ground fault circuit interrupters are installed in wet locations and other hazardous locations . . . D N S I S+

2. Receptacles are in good mechanical condition . . . D N S I S+

3. Receptacles are wired with proper polarity . . . . . D N S I S+

4. Power cords are of satisfactory size and quality to withstand normal and excessive wear and tear . . . . . D N S I S+

5. Strain reliefs and grommets are of sufficient strength to prevent groundfaults at entrance to equipment . . . . . D N S I S+

6. Do you have the proper instruments for checking leakage of current? . . . . . D N S I S+

7. Never use a 3 to 2 cheater plug . . . . . D N S I S+

8. Do not place electrical equipment on metal tables . . . . . D N S I S+

9. Use slow blow fuses as little as possible . . . . . D N S I S+

10. Use isolation transformer when working on a chassis that does not have a transformer . . . . . D N S I S+

11. Do not use 2 wire extension cords . . . . . D N S I S+

The following sections of the 1971 National Electrical Code are retroactive. All installations must be updated to comply with these sections.

Sections: 110-14, -17, -18, -21, -22
240-16, -19
250-3, -5, -7, -42, -43, -44, -45, -50, -51, -52
-57, -59.
400-3, -4, -5, -9, -10.
422-8, -9, -10, -11, -12, -14, -15, -16, -17.
430-142, -143.
Articles 500, 501, 502, 503

The NEC requires that receptacles on the same premises of different voltage, frequency and current (AC-DC) to be noninterchangeable. The only industry-wide standard that insures noninterchangeable configurations is the National Electrical Manufactures Association standards. NEMA configurations charts are available at most electrical supply houses.

V. FOUNDRY SAFETY

A. GENERAL

1. Tools and equipment should be stored neat and in safe positions . . . . . D N S I S+

2. Floors in the foundry area should be kept clean with sand heaped into neat piles . . . . . D N S I S+

3. Aisles in the foundry area should be adequate for safe handling of molten metal ladles while filling molds . . . . . D N S I S+

B. SAFE PRACTICES ON THE MOLDING FLOOR

1. Lifting - don't overlift, get help. Physical deficiencies should be reported to the person in charge . . . . . D N S I S+

2. It shall be necessary to maintain foundry equipment in a condition which will insure continued safe operation . . . . . D N S I S+
   This responsibility includes:

   a. Periodic and regular maintenance, safety check and keeping of records.

   b. Inspection of guards and protection devices at frequent and regular intervals.

C. SAFE PRACTICES IN MELTING

1. Fixed or permanent lead pot installations shall be exhausted . . . . . D N S I S+

2. Portable units shall be used only in areas where good general room ventilation is provided . . . . . D N S I S+

3. Personal protective equipment (gloves, eye-protection devices, aprons, leggings, and other items) shall be worn . . . . . D N S I S+

4. Equipment shall be kept clean particularly from accumulations of yellow lead oxide . . . . . D N S I S+

D. GRINDING

1. Personal protective equipment shall be used in grinding operations and equipment shall be used and maintained in accordance with ANSI B7.1 - 1970, Safety Code for the Use, Care and Protection of Abrasive Wheels . . . . . D N S I S+

VI. GRAPHIC COMMUNICATIONS AREAS

A. COMPOSING ROOM

1. Hot type composition

a. Linotype machines or mono types

1) Lead melting pot - enclosure guard . . . . . D N S I S+

2) Lead melting pot - exhaust guard . . . . . D N S I S+

3) Lead "Pegs" storage near machine . . . . . D N S I S+

4) Magazine storage racks . . . . . D N S I S+

5) Electrical ground. . . . . D N S I S+

6) Guards on exposed moving parts . . . . . D N S I S+

7) Operator's chair . . . . . D N S I S+

b. Elrod machines

1) Exhaust . . . . . D N S I S+

2) Electrical ground . . . . . D N S I S+

c. Ludlow Machines

1) Exhaust . . . . . D N S I S+

2) Electrical ground . . . . . D N S I S+

d. Foundry Type

1) Storage cabinets . . . . . D N S I S+

e. Metal Saws

1) Guards . . . . . D N S I S+

2) Saw blades . . . . . D N S I S+

f. Repro Proof Presses

1) Guards on rollers and wheels . . . . . D N S I S+

2) Floor space - working area . . . . . D N S I S+

3) Gears - enclosure. . . . . D N S I S+

2. Cold type composition

a. Typesetting machines (photo, strike-on, etc.)

1) High voltage areas enclosed . . . . . D N S I S+

2) Electricity grounded . . . . . D N S I S+

3) Machine ventilation . . . . . D N S I S+

4) Lighting (room) . . . . . D N S I S+

5) Working area around machine . . . . . D N S I S+

6) Operator's chair . . . . . D N S I S+

b. Photographic Paper Processors

1) Chemical storage . . . . . D N S I S+

2) Chemical replenisher containers . . . . . D N S I S+

3) Safety gloves and glasses . . . . . D N S I S+

4) Sinks for cleaning processor . . . . . D N S I S+

c. Art, Copy Preparation, and Paste-Up Area

1) Lighting . . . . . D N S I S+

2) Sharp tool storage (X-acto knives, razor blades, pins). . . . . D N S I S+

B. CAMERA STRIPPING AREAS

1. Cameras

a. Electrically grounded . . . . . D N S I S+

b. Working area around cameras . . . . . D N S I S+

c. Electrical wiring . . . . . D N S I S+

2. Darkroom

a. Ventilation . . . . . D N S I S+

b. Chemical storage . . . . . D N S I S+

c. Developing trays . . . . . D N S I S+

d. Equipment electrically grounded . . . . . D N S I S+

e. Safe lights . . . . . D N S I S+

f. Safety gloves . . . . . D N S I S+

3. Automatic Film Processor

a. Electrical grounding and wiring . . . . . D N S I S+

b. Enclosed rollers . . . . . D N S I S+

c. Plumbing . . . . . D N S I S+

d. Rubber Mat - Floor . . . . . D N S I S+

4. Vacuum Frame and Pump

a. Belt guard . . . . . D N S I S+

b. Electrical ground connections . . . . . D N S I S+

5. Stripping

a. Light tables . . . . . D N S I S+

b. Storage space around tables . . . . . D N S I S+

c. Storage of sharp tools . . . . . D N S I S+

C. PLATEMAKING AREAS

1. Platemakers

a. Electrical wiring and ground . . . . . D N S I S+

b. Enclosed exposure source . . . . . D N S I S+

c. Ventilation . . . . . D N S I S+

d. Guard on vacuum pump belt . . . . . D N S I S+

e. High voltage areas enclosed . . . . . D N S I S+

f. Working area around machine . . . . . D N S I S+

D. PRESS ROOM

1. Offset Presses . . . . . D N S I S+

a. Noise level . . . . . D N S I S+

b. Cylinder guards . . . . . D N S I S+

c. Roller guards . . . . . D N S I S+

d. Gear enclosure guards . . . . . D N S I S+

e. Motor drive and pump belt guards . . . . . D N S I S+

f. Electrical wiring and ground . . . . . D N S I S+

g. Covers on electrical boxes . . . . . D N S I S+

h. High voltage areas enclosed . . . . . D N S I S+

i. Working areas around presses . . . . . D N S I S+

j. Inspection light . . . . . D N S I S+

2. General Press Area

a. Organized tool rack . . . . . D N S I S+

b. Metal rag containers . . . . . D N S I S+

c. Storage areas for combustibles . . . . . D N S I S+

d. Metal containers for press chemicals . . . . . D N S I S+

E. BINDERY

1. Folders, Collators, Stitchers, Drill and Punch

a. Electrical wiring and ground . . . . . D N S I S+

b. Roller guards . . . . . D N S I S+

2. Paper Cutter

a. 2 hand operating . . . . . D N S I S+

b. Cutter bed . . . . . D N S I S+

c. Working area . . . . . D N S I S+

d. Enclosure guards . . . . . D N S I S+

F. GENERAL

1. Safety recording . . . . . D N S I S+

2. Lubrication procedures . . . . . D N S I S+

VII. MACHINE TOOLS

A. METAL GRINDING GUARDS AND DEVICES

1. Eye protection devices are provided for all grinding operations . . . . . D N S I S+

2. Abrasive wheels are guarded except those used for internal grinding and mounted wheels, under 2 inches, used in portable operations. . . . . D N S I S+

3. The safety guard covers the nut, spindle end and flange projections . . . . . D N S I S+

4. Grinding wheels are secured with flanges. Not less than 1/3 wheel diameter . . . . . D N S I S+

5. Cylindrical Grinders. The maximum angular exposure of the grinding wheel periphery and sides for safety guards does not exceed 180°. . . . . D N S I S+

6. Surface grinders and abrasive cut-off machines. The maximum angular exposure of the guard does not exceed 150° . . . . . D N S I S+

7. Wheel flanges are free of rough surfaces or sharp edges and are balanced . . . . . D N S I S+

8. All wheels are inspected and sounded before mounting . . . . . D N S I S+

9. Wheels are balanced and trued . . . . . D N S I S+

10. Wheels are not loaded or glazed . . . . . D N S I S+

11. Bushings used in the wheel do not exceed the width of the wheel . . . . . D N S I S+

12. Blotters cover entire contact area of the flanges . . . . . D N S I S+

13. Electrical controls are easily accessible to the operator . . . . . D N S I S+

14. Abrasive machines are equipped with exhaust systems . D N S I S+

15. "Slip proof" strips with coated abrasive granules are located in the standing area of the operator . . . . D N S I S+

16. Individual lights are located on abrasive machines so as to illuminate the wheel contact area . . . . . D N S I S+

17. Abrasive machines are securely anchored to prevent "walking" or moving . . . . . D N S I S+

18. Ear protective devices are provided if machines exceed 90 decibel level . . . . . D N S I S+

19. Guard design. The angular exposure of the grinding wheel does not exceed 90°. . . . . D N S I S+

20. On off-hand grinding machines, work rests are used to support the work . . . . . D N S I S+

21. Work rests are rigid in construction and are adjustable within 1/8" of the abrasive wheel . . . . D N S I S+

22. Abrasive wheels do not have an arbor size (hole) larger in diameter than 1/4 the wheel diameter . . . D N S I S+

See: Surface Grinders. I, g, h, i, j, k, l

23. Switches, resets, grounding and other electrical installations and utilization equipment meets the National Electrical Code, NFPA 70-1971; ANSI C1-1971 . . . . . D N S I S+

a. A power control is provided on each machine to make it possible for the operator to cut-off power without leaving his position.

B. METAL SAWS

1. Blade tensioning devices are in good working order and are designed to compensate for slightly oversize and undersize blades . . . . . D N S I S+

2. Electrical control switch is located on the "cut-off side" of the machine and is easily reached by the operator . . . . . D N S I S+

3. Vises and other work holding devices are readily adjustable and in good working order . . . . . D N S I S+

4. Metal saws should be placed so that long stock will not protrude into walkways . . . . . D N S I S+

5. An adjustable support is provided to support long stock . . . . . D N S I S+

6. Feed mechanisms are in good working order so as to feed the blade or work slowly and gradually into the work or blade . . . . . D N S I S+

7. Power driven gears are guarded at all times . . . . D N S I S+

C. TURNING, BORING, DRILLING MACHINES

1. Approved eye protection devices that have been designated for the type of work being done are provided . . . . . D N S I S+

2. Electric controls are located so they may be easily reached by the operator regardless of which side of the machine he is standing at . . . . . D N S I S+

3. Vises and other work holding devices are in good repair and meet safety specifications . . . . . D N S I S+

4. All pulleys, gears belts and other power transmitting mechanisms are in good working condition and completely enclosed with approved guards . . . . . D N S I S+

5. Means are provided to clamp, bolt or otherwise secure stock to tables, plates or other work surfaces . . . . . D N S I S+

6. All tools are sharp and ground to proper angles . . D N S I S+

7. Single point cutting tools, used in drilling-boring machines, such as flycutters, are completely guarded to protect operator's hands as well as to deflect chips . . . . . D N S I S+

8. Machines are secured to the floor . . . . . D N S I S+

9. Spindles, arbors, and chucks are true and operate with minimal perceptible "play" . . . . . D N S I S+

10. Floor area is dry and free of objects over which the operator might trip. Recommended slip proof strips applied to floor in general area . . . . . D N S I S+

11. All revolving collars and couplings are cylindrical and screws and bolts used in these do not project beyond the periphery of the collars . . . . . D N S I S+

D. MILLS

1. Approved eye protection devices that have been designated for the type of work being done are provided . . . . . D N S I S+

2. Machine is equipped with an adjustable light that provides 100 footcandles of illumination at the point of contact and a minimum of 50 footcandles where control and adjustments are made . . . . . D N S I S+

3. Ear protective devices are provided when machine exceeds 90 decibel level and operator is confined to the machine longer than 2 hours . . . . . D N S I S+

4. Electric control switch is located so operator can easily reach it without chance of bodily harm . . . . . D N S I S+

5. Machine is equipped with a conspicuous disengaging level (color coded) . . . . . D N S I S+

6. Machine is in good repair and all automatic disengaging equipment functions properly . . . . . D N S I S+

7. Belts, pulleys, gears, clutches and other power transmitting mechanisms are completely enclosed or covered with approved guards . . . . . D N S I S+

8. Machines are secured to the floor to prevent "walking". . . . . D N S I S+

9. Spindles and arbors are straight and true and operate with minimal play. . . . . D N S I S+

10. Floor area is dry and free of materials that could cause tripping, Recommended "slip proof" abrasive granules painted to floor in the standing area of the operator . . . . . D N S I S+

11. Coolants and other cutting fluids are restricted to general work area. They should not be allowed to spill over onto the floor . . . . . D N S I S+

12. No trip and emergency switches are of the automatic type, all require manual resetting . . . . . D N S I S+

13. All revolving collars and couplings are cylindrical and screws or bolts used in collars shall not project beyond the largest periphery of the collar or coupling . . D N S I S+

E. SHAPERS AND PLANERS

1. Approved eye protection devices that have been designated for the type of work being done are provided . . . . . D N S I S+

2. Electric controls are located in such a position that they are within easy reach of the operator regardless of his position . . . . . D N S I S+

3. Shaper ram is color coded to warn of potential danger. Floor in front of ram color coded . . . . . D N S I S+

4. When shaper ram is engaged, ram does not extend into walkways or traffic lanes . . . . . D N S I S+

5. All pulleys, belts, gears, and other driving mechanisms are completely guarded . . . . . D N S I S+

6. A heavy wire mesh screen or its equivalent is placed over the tool to prevent chips from striking operator or others . . . . . D N S I S+

7. The ram, tool head, tools, work table support, clamping screws and work holding devices are in good repair and can be properly secured in place or position with minimal or negative play . . . . . D N S I S+

8. Machine is equipped with an adjustable light that provides a minimum 50 footcandles of illumination at the work table . . . . . D N S I S+

9. Ear protective devices are provided if machine exceeds 90 decibel level . . . . . D N S I S+

10. Warning sign is placed near or on machine warning of possible danger of moving ram or table and of flying chips . . . . . D N S I S+

11. Machines are secured to the floor . . . . . D N S I S+

F. HAND TOOLS (MACHINE TOOLS AREA)

1. Hand tools are stored in tool cabinets, tool rooms, etc., that are easily accessible to the worker . . . D N S I S+

2. Tools are stored with sharp or pointed edges sheathed . . . . . D N S I S+

3. Tools are stored in cabinets at a height of 6 ft. or less . . . . . D N S I S+

4. Sharp and/or pointed hand tools are stored at a low height . . . . . D N S I S+

5. Tote carts and/or tote trays are provided for transporting tools to and from the machines . . . . D N S I S+

6. Chisels are properly sharpened and free of "mushroomed" heads . . . . . D N S I S+

7. Brass, lead and nonferrous hammers are free of loose heads and not mushroomed . . . . . D N S I S+

8. Signs indicating possible hazards of hand tools are located in or near tool storage areas . . . . . D N S I S+

9. Tool storage cabinets are not located in hazard areas. Example: tool cabinet located in front of abrasive cut-off machine. . . . . D N S I S+

10. Tools which are broken, damaged, or in need of repair or reconditioning are not replaced in tool cabinets . . . . . D N S I S+

11. Screwdrivers are properly ground and there is an assortment of sizes available . . . . . D N S I S+

12. Tool storage facilities with swinging doors swing 180° or are so designed that they do not block aisles and/or passageways . . . . . D N S I S+

VIII. SHEET METAL SHOP SAFETY

A. GUARDS

1. Use corner guards or other devices to protect people using the aisle or work areas where large sheets of metal protrude . . . . . D N S I S+

2. Guard all belts on the power punch . . . . . D N S I S+

3. Guards are provided at the rear of the shear at the point of operation . . . . . D N S I S+

4. Blocks are provided under the pedal of the foot operated shear, thick enough to prevent crushing of toes . . . . . D N S I S+

5. Guards are provided over top half of buffing wheel . . . . . D N S I S+

6. On the power hacksaw - a guard should cover the moving frame . . . . . D N S I S+

7. A guard or a warning device, such as a pylon of proper color is provided to station at end of long stock in a power hack saw when location warrants . . D N S I S+

B. GENERAL

1. Buffing wheels are far enough away from the machine or walls to prevent work from being cramped in between . . . . . D N S I S+

2. Store flammables away from a soldering area . . . . D N S I S+

3. Storage is provided for hot soldering coppers . . . D N S I S+

4. Flux is stored in spill proof containers . . . . . D N S I S+

5. Proper ventilation is provided to remove fumes in soldering area . . . . . D N S I S+

6. A nonflammable bench covering for soldering and to lay coppers on is provided . . . . . D N S I S+

7. Gas lines to furnace are properly installed and color coded . . . . . D N S I S+

8. Brushes are available to remove metal filings and chips from machines and benches . . . . . D N S I S+

9. Safe hand working tools are provided . . . . . D N S I S+

10. Handles are provided for all files . . . . . D N S I S+

11. Secure storage is provided for all hand tools . . . D N S I S+

12. Discard distorted or excessively worn tools . . . . D N S I S+

IX SAFETY IN THE SMALL ENGINES SHOP

A. GENERAL

1. All students must wear safety glasses . . . . . D N S I S+

2. Small engines are not run without mufflers or muffler systems in place . . . . . D N S I S+

3. Ventilation for exhaust fumes must be adequate . . . D N S I S+

4. Proper instruction for working with and handling possible flying hazards such as valve springs, impact wheel pullers, piston rings, etc., has been provided . . . . . D N S I S+

5. A permanent mounting frame is used to start and and adjust all small engines . . . . . D N S I S+

6. The floor is clean or free of any oil or grease spillage . . . . . D N S I S+

7. All shrouds, shields, and protection devices are in place on small engines and power lawnmowers before they are started . . . . . D N S I S+

8. Appropriate clothing is worn properly for the job being done. Coveralls and shop coats are washed at regular intervals established by instructor . . . D N S I S+

9. All flammable and combustible materials are properly stored and handled . . . . . D N S I S+

10. All positions of the operating controls on power lawnmowers are clearly identified . . . . . D N S I S+

11. Blades are checked for the limit of 15 seconds for stopping after declutching or shutting off power from the manufacturers specified maximum speed . . . D N S I S+

12. Blades on rotary mowers are checked for a maximum top speed of 19,000 feet per minute . . . . . D N S I S+

X. SAFETY IN THE WELDING SHOP

A. ARC WELDING

1. Helmets and welding goggles must be free of cracks and holes . . . . . D N S I S+

2. Wear protective clothing . . . . . D N S I S+

3. Safety lenses in goggles and helmets for both electric arc and oxy acetylene welding must be used . D N S I S+

4. The proper shade numbers of filter lenses or windows should be used . . . . . D N S I S+

WELDING OPERATION	SHADE NO.
a. Shielded metal arc welding 1/16, 3/32, 1/8, 5/32 inch electrodes	10
b. Inert-gas metal arc welding (non-ferrous) 1/16, 3/32, 1/8, 5/32 inch electrode	11
c. Inert-gas metal arc welding (ferrous) 1/16, 3/32, 1/8, 5/32 electrode	12
d. Shielded metal arc welding 3/16, 7/32, 1/4 inch electrode	12
5/16, 3/8 inch. electrode	14

e. Atomic hydrogen weld 10-14

f. Carbon arc welding 14

5. Capes or shoulder covers made of leather or other suitable materials are to be worn during overhead welding or cutting operations . . . . . D N S I S+

6. Wear leather gauntlet type gloves that can be thrown off . . . . . D N S I S+

7. Wear high top shoes rather than undercut shoes . . . D N S I S+

8. Always wear eye protection when chipping . . . . . D N S I S+

9. Keep sleeves and pants cuffs rolled down and collar buttoned up . . . . . D N S I S+

10. Always mark hot metal HOT . . . . . D N S I S+

11. Where small work must be handled, have pliers, tongs, or other appropriate tools handy . . . . . D N S I S+

12. Never strike an arc on compressed air cylinders . . D N S I S+

13. Clean metal surfaces before welding . . . . . D N S I S+

14. Work in a dry area . . . . . D N S I S+

15. Keep cables free from your body so you can move freely . . . . . D N S I S+

16. Don't change polarity or connections when a welder is being used . . . . . D N S I S+

17. Adequate ventilation is provided to pull all smoke and fumes given off by the welder and material . . . . . D N S I S+

18. All flammable materials used should be removed from the work area . . . . . D N S I S+

19. The floor is free of all electrodes . . . . . D N S I S+

20. Clamps and other tools are kept off the floor and put away . . . . . D N S I S+

21. Gasoline powered welders are only used where exhaust fumes do not impair the health and safety of personnel in the area . . . . . D N S I S+

22. Tack welding is never done without a helmet . . . . D N S I S+

23. Terminals for welding leads should be protected from accidental electrical contact by personnel or by metal objects . . . . . D N S I S+

24. All ground connections should be mechanically strong and electrically adequate for the required current . . . . . D N S I S+

25. For individual welding machines, the rated current-carrying capacity of the supply conductors shall not be less than the rated primary current of the welding machines . . . . . D N S I S+

26. Grounding of the welding machine frame shall be checked . . . . . D N S I S+

    a. Special attention shall be given to safety ground connections of portable machines.

27. Electrode holders when not in use shall be so placed that they cannot make electrical contact with persons, conducting objects, fuel or compressed gas tanks . . . . . D N S I S+

28. Cables with splices within 10 feet of the holder shall not be used . . . . . D N S I S+

29. Machines which have become wet shall be thoroughly dried and tested before being used . . . . . D N S I S+

30. Work and electrode lead cables should be frequently inspected for wear and damage . . . . . D N S I S+

31. Each machine shall have a safety-type disconnecting switch or circuit breaker to open each power circuit to the machine, conveniently located at or near the machine, so that power can be shut down for servicing . . . . . D N S I S+

32. Ignitron tubes used in resistance welding equipment are equipped with a thermal protection switch . . . D N S I S+

33. Controls of all automatic or air and hydraulic clamps shall be arranged or guarded to prevent the operator from accidentally activating them . . . D N S I S+

34. Spot and seam welding machines (nonportable) external weld initiating control circuits shall operate on low voltage, not over 120 volts, for the safety of the operators . . . . . D N S I S+

35. All foot switches shall be guarded to prevent accidental operation of the machine . . . . . D N S I S+

36. The hazard of flying sparks should be eliminated by the use of shields . . . . . D N S I S+

37. Ducts and conveyor systems that might carry sparks to distant combustibles shall be protected or shut down . . . . . D N S I S+

38. Cutting or welding on barrels, drums or other containers shall take place only after they are thoroughly cleaned . . . . . D N S I S+

39. Welding cable and other equipment should be clear of passageways, ladders and stairways . . . . . D N S I S+

40. Adequate ventilation must be provided in all welding areas to pull out fumes given off during the welding process . . . . . D N S I S+

B. GAS WELDING EQUIPMENT

1. Acetylene shall not be generated, piped (except in approved cylinder manifolds) or utilized at a pressure in excess of 15 p.s.i. gage pressure or 30 p.s.i. absolute pressure . . . . . D N S I S+

2. Only approved apparatus such as torches, regulators or pressure reducing valves, acetylene generators, and manifolds shall be used . . . . . D N S I S+

3. All portable cylinders used for storage and shipment of compressed gases shall be in accordance with the regulations of the U.S. Dept. of Trans. . . D N S I S+

4. Compressed gas cylinders shall be legibly marked for the purpose of identifying the gas content, with either the chemical or the trade name of the gas . . . . . D N S I S+

5. Compressed gas cylinders shall be equipped with connections complying with the American National Gas Cylinder Valve Outlet and Inlet Connections, (ANSI, B57.1-1965) . . . . . D N S I S+

6. All cylinders with a water weight capacity of over 30 pounds shall be equipped with means of connecting a valve protection cap or with a collar or recess to protect the valve . . . . . D N S I S+

7. Cylinders shall be kept away from radiators and other sources of heat . . . . . D N S I S+

8. Inside of buildings cylinders shall be stored in a well protected, well ventilated, dry location, at least 20 feet from highly combustible materials. Cylinders shall not be kept in unventilated enclosures such as locker and cupboards . . . . . D N S I S+

9. Empty cylinders shall have their valves closed . . . D N S I S+

10. Valve protection caps, shall always be in place, hand tight, except when cylinders are in use or connected for use . . . . . D N S I S+

11. Inside a building, cylinders, except those in actual use or attached ready for use, shall be limited to a total gas capacity of 2,000 cubic feet of 300 pounds of liquefied petroleum gas . . . D N S I S+

12. For special storage in excess of 2,000 cubic feet total gas capacity of cylinders or 300 pounds of liquefied petroleum gas, special storage must be provided . . . . . D N S I S+

13. Acetylene cylinders shall be stored valve end up . . D N S I S+

14. Oxygen cylinders shall not be stored near highly combustible materials, or in an acetylene generator compartment . . . . . D N S I S+

15. Oxygen cylinders in storage shall be separated from fuel-gas cylinders of combustible materials (especially oil or grease), a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour . . . . . D N S I S+

16. Cylinders, cylinder valves, couplings, regulators, hose, and apparatus shall be kept from oily or greasy substances . . . . . D N S I S+

17. Cylinders shall not be dropped or struck or permitted to strike each other violently . . . . . D N S I S+

18. Unless cylinders are secured on a truck, regulators shall be removed and valve protection caps, when provided for, shall be put in place before cylinders are moved . . . . . D N S I S+

19. Cylinders not having fixed hand wheels shall have keys, handles, or nonadjustable wrenches on valve stems while these cylinders are in service . . D N S I S+

20. Cylinder valves shall be closed before moving cylinders . . . . . D N S I S+

21. Cylinder valves shall be closed when work is finished . . . . . D N S I S+

22. Cylinders shall be placed far enough from the actual welding or cutting operation so that sparks, hot slag or flame will not reach them, or fire resistant shields shall be provided . . . . . D N S I S+

23. Cylinders shall not be placed where they might become part of an electric circuit . . . . . D N S I S+

24. Cylinders shall never be used as rollers or supports, whether full or empty . . . . . D N S I S+

25. No one shall tamper with safety devices in cylinders of valves . . . . . D N S I S+

26. Unless connected to a manifold, oxygen from a cylinder shall not be used without first attaching an oxygen regulator to the cylinder valve . . . . . D N S I S+

27. The cylinder valve must be opened slowly . . . . . D N S I S+

28. An acetylene cylinder shall not be opened more than one and one-half turns of the spindle and preferrably no more than three-fourths of a turn . . . . . D N S I S+

29. Before a regulator is removed from a cylinder valve, the cylinder valve shall be closed and the gas released from the regulator. . . . . D N S I S+

30. A faulty cylinder should be tagged and removed to a safe area, and notify the supplier . . . . . D N S I S+

31. Oxygen and acetylene cylinders shall both be stored in the vertical position and secured to a wall or some type of stationary object by the means of a chain . . . . . D N S I S+

32. Where a special wrench is required it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be quickly turned off in case of an emergency. . D N S I S+

33. Manifolds shall be approved separately for each component part or as an assembled unit . . . . . D N S I S+

34. If cylinders are found to have leaky valves or fittings which cannot be stopped by closing of the valve, the cylinders shall be taken outdoors away from sources of ignition and slowly emptied . . D N S I S+

35. Valve-protection caps shall not be used for lifting cylinders from one vertical position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen; the use of warm (not boiling) water is recommended . . . . . D N S I S+

36. All manifolds and parts used in methods of manifolding shall be used only for the gas or gases for which they are approved . . . . . D N S I S+

37. Helmets, hand shields, goggles with clear or color lenses shall be provided for all welding operations . . . . . D N D I S+

38. Protective clothing, gauntlet, gloves, aprons, high top shoes, and leathers shall be provided and used for all welding operations . . . . . D N S I S+

XI. GENERAL WOODWORKING MACHINERY

A. GENERAL

1. Dull, badly set, improperly filed, or improperly tensioned saws shall be immediately removed from service . . . . . D N S I S+

2. All belts, pulleys, gears, shafts, and moving parts shall be guarded . . . . . D N S I S+

3. If power hand tools use more than 90 volts it has to be grounded through the use of a separate grounding wire and polarized plug and receptacle . . D N S I S+

4. Power controls and operating controls should be located within easy reach of the operator while he is at his regular work location, making it unnecessary for him to reach over cutter to make adjustments . . . . . D N S I S+

5. All knives and cutting heads of woodworking machines shall be kept sharp, properly adjusted, and firmly secured . . . . . D N S I S+

6. Bearings shall be kept free and well lubricated . . . D N S I S+

7. Arbors of all table saws and other machines shall be tight fitting to the blades and cutters . . . . . D N S I S+

8. Sharpening or tensioning of saw blades or cutters shall be done only by persons of demonstrated skills in this kind of work . . . . . D N S I S+

9. Emphasis is placed upon the importance of maintaining cleanliness around woodworking machinery particularly as regards the effective functioning of guards and the prevention of fire hazards in switch enclosures, bearings, and motors . . . . . D N S I S+

10. Push sticks or push blocks shall be provided at the work place in the several sizes and types suitable for the work to be done . . . . . D N S I S+

B. TABLE SAW

1. Table saw must have a guard that covers the blade, it must automatically adjust itself to the thickness of and remain in contact with the material being cut but it shall not offer any considerable resistance to insertion of material to saw or to passage of the material being sawed . . . . . D N S I S

2. Each table saw must have a spreader to prevent the material being cut from squeezing the saw blade . . D N S I S

3. Each table saw also must have an anti-kickback device or dogs so located as to oppose the thrust or tendency of the saw to pick up the material and throw it back . . . . . D N S I S

C. RADIAL ARM SAW

1. Each radial saw must have an upper hood that completely encloses the upper portion of the blade, down to the point that will include the end of the saw arbor. The sides of the lower exposed portion of the blade shall be guarded to the full diameter of the blade by a device that will automatically adjust itself to the thickness of the stock being cut to give maximum protection . . . . . D N S I S

2. On a radial arm saw used for ripping, anti-kickback fingers or dog shall be placed on both sides of the saw . . . . . D N S I S

3. The direction of the saw rotation shall be conspicuously marked on the hood. In addition, a permanent lable not less than 1½" by 3/4" shall be affixed to the rear of the guard at approximately the level of the arbor. It should read as follows:

"DANGER: Do not rip or plough from this end" . D N S I S

D. BAND SAW

1. All portions of the saw blade shall be enclosed or guarded, except for the working portion of the blade between the bottom of the guide rolls and the table. Bandsaw sheets shall be fully encased. The guard for the portion of the blade between the sliding guide and the upper saw-wheel guard shall protect the saw blade at the front and outer side. This portion of the guard shall be self-adjusting to raise and lower with the guide . . . . . D N S I S

2. Effective brakes should be provided to stop the wheel in case of blade breakage . . . . . D N S I S+

3. Each band saw shall be provided with a tension control device to indicate the proper tension for standard blades on the machine . . . . . D N S I S+

E. JOINTERS

1. The knives on the cutter should not project over 1/3" over the cutting head . . . . . D N S I S+

2. The table throat opening shall not be over 2½" when tables are set or aligned with each other for zero cut . . . . . D N S I S+

3. Each jointer shall have an automatic guard which will cover all the section of the head on the working side of the fence or guage. The guard shall be automatically adjusted to cover the unused portion of the head and shall remain in contact with material at all times . . . . . D N S I S+

4. Each jointer shall have a guard which will cover the section of the head in back of the gaugefence. . D N S I S+

5. Each wood jointer with vertical head shall have either an exhaust hood or other guard so arranged as to enclose completely the revolving head except for a slot of such width as may be necessary and convenient for the application of the material to be joined . . . . . D N S I S+

F. DRILL PRESSES AND MORTISING MACHINES

1. Boring bits should be provided with a guard that will enclose all portions of the bit and chuck above the material being worked . . . . . D N S I S+

2. All belts and pulleys must be guarded . . . . . D N S I S+

G. SURFACE PLANERS

1. Surfacers or planers used in thicknessing multiple pieces of stock simultaneously shall be provided with sectional infeed rolls having sufficient yield in the construction of the sections to provide feeding contact pressure on the stock over the permissible range of variation in stock thickness specified for which the machine is designed . . . . . D N S I S+

2. All of the cutter heads must be covered by a metal guard where an exhaust system is used: the guard shall form part or all of the exhaust hood and shall be constructed of metal . . . . . D N S I S+

3. Feed rollers shall be guarded to prevent hands of the operator from coming in contact with them . . . D N S I S+

SUGGESTED TIME TABLE FOR IMPLEMENTATION OF A SCHOOL SHOP SAFETY PROGRAM

INTRODUCTION

The first objective of an accident prevention program in school shops and laboratories is immediate and urgent - to prevent accidents which might result in injury or harm to students, teachers, or other school personnel or visitors, damage to facilities and equipment, or interruption of the educational processes. This objective goes into operation on the opening day of any new industrial or vocational education program.

It is known that zeroing in on accident totals in the industrial education shops of the nation's schools is difficult. Current and reliable findings which deal specifically with accidents in industrial arts and vocational education are often localized and somewhat limited. However, a survey by the National Safety Council of 57,000 school jurisdictional accidents among male youth revealed that industrial arts and related activities ranked fifth highest in accident frequency among fifty-three school activities. Further, a state-wide accident survey in Ohio revealed the following facts concerning student injuries in industrial arts classes; National Safety Council, Data Sheet Number 70, Coordinating Accident Prevention in Industrial and Vocational Education Programs.

a. The most common type of injury is a laceration, followed by burns and scalds, contusions and bruises, foreign materials and punctures.

b. A student is more likely to be struck by something rather than caught in, on, or between objects.

c. The parts of the body injured most frequently by students are the fingers, hands, eyes, feet and forearms.

d. Fifteen-year-olds are involved in the most accidents followed by 16-, 17-, 18-, and 14-year-olds.

e. Most accidents occur in October and November; the least number occur in May and June.

f. Students with one to four months of shop training have the highest frequency of accidents. Students with 13 to 16 months have the lowest.

g. More accidents occurred in the wood shop than any other areas. Next in order were general shop, machine, welding, sheet metal, auto and graphic arts.

h. More accidents were caused by the band saw than any other device. Next was sheet metal stock, then the metal lathe, chisels, wood lathe, wood jointer, grinders, welding equipment, metal drills, circular saw and hand saw.

i. Many accidents are attributed to workers behaving irresponsibly.

It is apparent that much emphasis has been placed on accidents and their related causes. This emphasis tends to suggest that accidents occur in a specific frequency or pattern such as time of day, day of the week, and month of the year. The responsibility for accidents has been placed on age, area of work, type and condition of tools, and the experience of the student. But it should be emphasized that accidents will continue to occur whenever unsafe acts or unsafe physical conditions exist.

For this reason, school administrators, safety coordinators and vocational and practical arts teachers interested in reviewing existing safety programs, or establishing new programs, should consider the following time-table in coordinating safety in their programs.

TIME-TABLE:

This section will describe in an easy to follow chart, a good way to implement a safety program in your school shop. The chart may have to be altered to fit your special situation, since the occurrence and severity of accidents may be very different from situation to situation.

The chart deals with three fundamental areas: the teacher, the shop laboratory, and the student. Under the three basic areas are then listed specific areas to work with, and suggestions to follow in the implementation of safety standards.

*A. THE TEACHER

Goals

1. Establish Safety Policy
   Implement OSHA
2. Provide for Safety Inspections
   as outlined in this handbook
3. Provide Safe Environment
4. Delegate Authority
   Involve all instructors
   in the safety program
5. Provide Training - Education
6. Investigate Accidents
7. Maintain Records
   Use safety forms provided
   in this handbook

B. LABORATORY

Goals

1. Eliminate Mechanical and
   Physical Hazards
   a. Safe Working Surfaces
      1) This should prevent slips and falls.

b. Guarding Machinery

c. Safe Materials - Handling Methods

d. Maintaining Tools and Equipment

e. Maintaining Good Housekeeping

f. Grounding and Controlling Electricity

2. Eliminating Environmental and Chemical Hazards

a. Provide Personal Protective Clothing and Equipment

b. Controlling Air Contaminants

c. Establishing Noise Control Measures

d. Controlling Toxic Substances and Chemicals

e. Controlling Temperature and Humidity

f. Maintaining Adequate Illumination

g. Radiation Control

*C. STUDENT

Goals

1. Supervision

2. Stimulate Interest

a. Safety Committee - Involve students with program implementation

b. Incentives

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* The categories that are listed are to be used as tools in the development of a priority list for the development of safety standards in your vocational program. The emphasis that you place on each category may reflect problems that will affect your program. You may wish to put priority on items that have proven to be trouble areas in the past history of your shop.

The list is to be used as a reference in selecting items to be dealt with as you improve the safety environment in your shop. Whatever type of program you set up in your shop, <u>your first priority categories should be those that are imminent or serious violations as determined by your initial inspections</u>.

RECORD KEEPING

OSHA requires employers (teachers) of eight or more employees (students) to keep certain records of job-related fatalities, injuries, and illnesses. OSHA requires that only three simple forms be maintained. It will be necessary for teachers to periodically evaluate these forms in order to correct situations that have proven to cause accidents.

1. OSHA 100 - A log on which each reportable case is entered on a single line.
2. OSHA 101 - A supplementary record with details on each individual case.
3. OSHA 102 - An annual summary compiled from the log. This summary must be posted in the workplace by February 1, of each year, and kept there one month for employee (student) examination.
4. OSHA SAFETY POSTER - To be posted in a spot in such a manner that all students may easily read it.

If there are no recordable deaths, injuries or illnesses, there's nothing to fill in.

All employers (teachers) not exempt, those with eight or more employees (students), from the recordkeeping requirements must have the forms available when an OSHA compliance officer makes an inspection. The forms do not have to be mailed to any OSHA office.

SUGGESTED REFERENCES

1. My Brothers Keeper Price $10.00	E. A. Brown 1702 Corky Avenue Santa Rosa, Calif. 95411
2. Safety In Your Future Price $ .15	Supt. of Documents U.S. Government Printing Office Washington, D.C. 20402
3. Principles & Techniques of Mechanical Guarding Price $..40	Supt. of Documents U.S. Government Printing Office Washington, D.C. 20402
4. U.S.A. Standard Practice for Occupational & Educational Eye and Face Protection Price - Free	National Society for the Prevention of Blindness, Inc. 79 Madison Avenue New York, New York 10016
5. Accident Prevention Manual for Shop Teachers	William A. Williams Chicago: American Technical Society, 1963
6. An Accident Prevention Program for Shops and Laboratories	William A. Williams Chicago: National Safety Society, 1968
7. Teaching Liability in School Shop Accidents	Denis J. Kigin, Ann Arbor, Michigan: Prakken Publications, Inc., 1963
8. School Shop - Learn Safe Work Habits Here	Washington, D.C.: U.S. Dept. of Health, Education and Welfare and U.S. Dept. of Labor, 1955.

FILMS, CHARTS, BOOKLETS & RESOURCE KITS

1. General Motors offers a variety of films and other training aids on safety. Write to -

   General Motors Corporation
   Public Relations Staff
   Room 1-101
   General Motors Building
   Detroit, Michigan

2. The following films on safety are available on a free loan basis from Pacific Telephone.

   Pacific Telephone
   Film Library
   16 Spear Street
   San Francisco, California 94105

   a. Anatomy of an Accident
   b. Before It's Too Late
   c. Charlie's Haunt
   d. Fire, Cause for Alarm
   e. Rescue Breathing
   f. Slips and Falls

3. Films on safety from Modern Talking Picture Service: Order from:

   Modern Talking Picture Service
   16 Spear Street
   San Francisco, California 94105

   a. Plus 2
   b. The Six Deadly Skids
   c. Safe Mowing Is No Accident
   d. Best Foot Forward
   e. Margin of Safety
   f. Testing Requisite for Fire Safety

4. Items that can be obtained from:

   Publications Department
   Factory Insurance Association
   85 Woodland Street
   Hartford, Connecticut 06102

   Pamphlet: RGP For Safeguarding Class B and Class C Furnaces and Ovens 1957 48 pages.

   Booklet: "Preventing Cutting and Welding Fires" 12 pages.

Maintenance and Safety. (Bull. 246). 1962. 15 pp. 15 cents.

Mechanical Handling of Materials. (Bull. 219). 1960. 29 pp.

Mechanics for the Safety Man. (Bull. 239). 1962. 21 pp. 15 cents.

Personal Protective Equipment. (Bull. 231). 1961 26 pp.

Static Electricity. (Bull. 256). 1963. 20 pp. 15 cents.

Teach Them To Lift. (Bull. 110). Revised 1965. 22 pp. 15 cents.

Environmental and Chemical Hazards

Chemistry for the Safety Man. (Bull. 222). Revised 1968. 26 pp. 25 cents.

Control of the Physical Environment. (Bull. 211). Revised 1967. 13 pp. 15 cents.

Respiratory Protective Equipment. (Bull. 226). 1961. 34 pp. 20 cents.

The Inorganic Acids. (Bull. 265). 1964. 27 pp. 15 cents.

The Use and Handling of Compressed Gasses. (Bull. 259). 1963. 30 pp. 15 cents.

Organization and Administration

The Fundamentals of Accident Prevention. (Bull. 247). 1962. 14 pp.

The Consultative Approach to Safety. (Bull. 223). 1960. 9 pp.

Using Injury Statistics. (Bull. 255). 1963. 18 pp. 15 cents.

Construction

Planning for Safety on the Jobsite. (Bull. 273). 1966. 41 pp. 25 cents.

Chart: "Use The Proper Extinguisher" 11" x 17" Form N-80

Posters: "Avoid Negligence in Cutting and Welding"
8½ x 11" - Form N6E

"Fires Feed on Litter" 8½ x 11" Form N-283

"Look Before You Lift" 8½ x 11" Form N-239-A

"Watch Those Cutting and Welding Sparks"
8½ x 11" Form N-223-A Rev. 2-73

Tags: "Cutting and Welding Equipment Precautions" 4" x 8"
Form N-97

5. Materials available from:

Department of Industrial Relations
Division of Industrial Relations
455 Golden Gate Avenue
San Francisco, California 94102

S-108 Taming the Circular Saw
S-117 Stop Grinding Out Injuries
S-120 Safety Rules for Jointers
S-122 Handy Rules for Hand Tools
S-123 Three Steps for the Safe Use of Portable Ladders
S-124 Safety Rules for Roofers
S-135 Check List of Requirements
S-137 Skin Trouble Is Plenty Trouble
S-141 Power Hand Saw Safety
S-151 Control of Noise in Industry
S-157 Guard Standards No. 2 Stairways and Railings

Placards

S-617 "Wear Goggles, You Can Get Used to Goggles - But Never to A Glass Eye" 8½ x 11"

6. Selected publications of the Bureau of Labor Standards -

Address: Bureau of Labor Standards
U.S. Department of Labor
Washington, D.C. 20210

Bull. 197 The Principles and Techniques of Mechanical Guarding
58 pp.

Safety in Industry - Mech. & Physical Hazards, Construction, etc.

Control of Electrical Shock Hazards. (Bull. 2160)
Revised 1968. 15 pp. 20 cents.

Fire Protection for the Safety Man (Bull. 232)
1961. 25 pp. 15 cents.

Technical References. Information on the materials, equipment, practices, standards, and conditions which may affect the safety and health of workers.

A How-To-Lift Model -- Build and Demonstrate This Safety Salesman. 1967. 4 pp.

Know Your Fire Extinguishers. 1968. 4 pp. 15 cents.

TRAINING AIDS

How To Inspect Charts. Detailed illustrated information for use by persons responsible for safety inspections of industrial machinery and construction equipment. Based on the latest available national safety standards.

Radial Saw. 1968. 1 p.
Bench and Floor Stand Grinder, No. 3. 1963. 1 p.
Table Saw. 1968. 1 p.
Scaffold Construction (Light Duty), No. 7. 1963. 1 p.
Scrapers (Construction). 1968. 4 pp.
Wood Shaper, No. 10. 1963. 1 p.
Demolition. 1964. 2 pp.
Tubular Steel Frame Scaffold. 1966. 1 p.
Tubular Steel Tube and Clamp Scaffolding. 1966. 1 p.
Material Hoist. 1968. 4 pp.

Safety Training Instructor Outlines. Course outlines for use in conducting courses on safety subjects. Each outline includes technical information on the subject with suggestions for visual aids. Suitable for use in industrial safety courses presented in plants, unions, schools, government agencies, vocational training programs, and apprenticeship classes. Several general safety program topics are appropriate for workers in other than industrial-type occupations.

Accident Cause Analysis. (Bull. 270). 1965. 19 pp. 20 cents.

Accident Cost Control. (Bull. 268). 1965. 14 pp. 20 cents.

Accident Investigations and Records. (Bull. 288). 1967. 28 pp. 30 cents.

Appraising Safety Performance. (Bull. 269). 1965. 14 pp. 20 cents.

Basic Principles of Machinery Safeguarding. (Bull. 276). 1965. 66 pp. 40 cents.

Construction Safety Site Clearing. (Bull. 302). 1967. 20 pp. 25 cents.

Controlling Energy Hazards. (Bull. 303). 1968. 36 pp. 35 cents.

Demolition. (Bull. 277). 1966. 67 pp. 45 cents.

Fire and Explosion Prevention and Protection. (Bull. 296) 1967. 74 pp. 50 cents.

Handling Materials Safely. (Bull. 291). 1967. 52 pp. 40 cents.

Housekeeping for Safety. (Bull. 295). 1967. 17 pp. 25 cents.

Illumination for Safety. (Bull. 297). 1967. 11 pp. 20 cents.

Introduction to Industrial Safety. (Bull. 267). 1965. 19 pp. 20 cents.

Job Hazard Analysis. (Bull. 287). 1967. 22 pp. 25 cents.

Personal Protective Equipment. (Bull. 299). 1967. 37 pp. 35 cents.

Planning Layout and Arrangement for Safety. (Bull. 289). 1967. 24 pp. 25 cents.

Preventive Maintenance for Safety. (Bull. 290). 1967. 20 pp. 25 cents.

Promoting Worker Interest in Safety. (Bull. 284). 1967. 12 pp. 20 cents.

Responsibility for Safety. (Bull. 283). 1967. 22 pp. 25 cents.

Safe Use of Hand and Portable Power Tools. (Bull. 293). 1968. 18 pp. 35 cents.

Safe Working Surfaces. (Bull. 292). 1967. 32 pp. 35 cents.

Safety Inspection Procedures. (Bull. 286). 1967. 42 pp. 35 cents.

Safety Organization. (Bull. 285). 1967. 32 pp. 30 cents.

The Consultative Approach for Safety Promotion. (Bull. 301). 1967. 19 pp. 25 cents.

Use of Color for Safety. (Bull. 298). 1967. 27 pp. 30 cents.

Occupational Safety Aids. A series of leaflets covering various subjects relating to an occupational safety program. Useful as discussion material for meetings as well as a student aid in training courses.

Accident Causes. 1967. 8 pp. 10 cents.
Conducting a Job Hazard Analysis. 1967. 8 pp. 10 cents.
Elements of a Safety Program. 1967. 12 pp. 15 cents.
Good Housekeeping. 1967. 8 pp. 10 cents.
How To Investigate Accidents. 1967. 8 pp. 10 cents.
Inspecting for Safety. 1967. 8 pp. 10 cents.
Promoting Worker Interest. 1967. 8 pp. 10 cents.
Recording Employee Injuries. 1967. 8 pp. 10 cents.
Safe Lifting. 1966. 8 pp. 10 cents.
Safety Committee Activities. 1967. 8 pp. 10 cents.
Safety Training Techniques in the Classroom. 1967. 8 pp. 10 cents.
Supervisory Responsibility for Safety. 1967. 8 pp. 10 cents.
The Development of the Safety Movement. 1967. 8 pp. 10 cents.

Occupational Safety Charts. Illustrations and descriptions of safe operating requirements for common types of machine tools and other equipment found in industrial establishments.

Hand Trucks, Chart 1
Scaffolds, Chart 3
Arc Welding, Chart 4
Gas Welding and Cutting Equipment, Chart 5
Grinding Wheels, Chart 6
Power Shears, Chart 9
Electrical Equipment, Chart 10
Low Voltage Electrical Equipment, Chart 11
Ladders, Chart 12
Drill Presses, Chart 14
Punch Presses, Chart 15
Overhead Cranes, Chart 16
Metal Shapers, Chart 17
Hand Tools
Freight Elevators, Chart 19

Safe Work Guides--Construction. A new series devoted to construction worker safety. One-page flyers available for distribution to workers at the jobsite.

Accidents in Crane Operation. 1967.
Demolition Workers. 1965.
Hammers. 1968.
On the Job Traffic. 1967.
Site Clearing. 1967.
Wrenches. 1968.

Student References. Materials supplementing bulletins and other texts for use by students in safety training courses.

Cup Grinding Wheel Mounting. 1 p.
Flat Grinding Wheel Mounting. 1 p.
Levels of Illumination for Various Kinds of Industrial Work. 1954. 1 p.
Injury Frequency Rate Table. 9 pp.
Portable Electric Equipment, Inspection Tips. 1965. 2 pp.
Shaped Grinding Wheel Mounting. 1 p.
Control of Electrical Shock Hazards. 1966. 2 pp.
Construction Fatalities for Analysis. 1966. 6 pp.
Woodworking Machines. 1966. 8 pp.

Student Work Sheets. Furnished to students taking courses covered by Instructor Outlines for use in training exercises on several subjects.

Accident Analysis and Remedial Action. 1964. 30 pp.
Accident Cause Analysis (Sam Brown). 1 p.
Accident Cause Analysis (William Smith). 1 p.
Accident Causes. 1965. 1 p.
Accident Factor Analysis (Form). 1965. 2 pp.
Check Sheet for Face, Head, and Eye Protection. 1964. 2 pp.
Computing Injury Rates. 1967. 1 p.
Control of Electrical Shock Hazards. 1967. 1 p.
Demolition--Construction Safety Course. 1964. 1 p.
An Electrical Hazard Inspection Check Sheet. 1960. 2 pp.
Frequency Rate Computation. 1964. 1 p.
Good Housekeeping. 1960. 1 p.
Housekeeping Floor Plan Work Chart. 1 p.
How To Investigate Accidents. 1965. 1 p.
Injury Severity Rate Computation. 1966. 1 p.
A Ladder and Stairway Inspection Sheet. 1964. 4 pp.
Manual Handling Materials. 1960. 1 p.
Mechanical Handling of Materials. 1961. 1 p.
Metal Working Machines. 1960. 6 pp.
Personal Protective Equipment. 1967. 1 p.
A Plant Handtool Inspection Sheet. 1959. 4 pp.

O. S. H. A. Publications

Selected Publications

Copies of the following publications are available in limited quantities from your nearest OSHA Office.

Certain publications are available for purchase from the Superintendent of Documents. Prices of government publications are subject to change. Occasionally, increases in costs make it necessary for the superintendent of documents to increase the selling prices of many publications offered. As it is not feasible for the Superintendent of Documents to correct the prices manually in all of the publications stocked, the prices charged on your order may differ from the prices printed in the publications.

1. Ley De Seguridad Y Salud Ocupacionales De 1970 PL 91-596 (OSHA 2069) Aug. 1973

   Full text of the Occupational Safety and Health Act of 1970 in Spanish.

2. All About OSHA (OSHA 2056) Sept. 1973

   Booklet explaining the provisions of the Occupational Safety and Health Act and OSHA's role in implementing those provisions.

3. Safety and Health Protection on the Job (OSHA 2003) Revised Nov. 1973

   Official OSHA poster required by law to be prominently displayed in the workplace.

4. Questions & Answers to Part 1910 - The OSHA General Industry Standards (OSHA 2095) Nov. 1973

   Booklet of answers to questions most often asked about the OSHA General Industry standards.

5. Fact Sheet for Small Businesses on Obtaining Compliance Loans (OSHA 2005) Jan. 1972

   Flyer outlining small business procedures in obtaining OSHA help in applying for Small Business Administration loans to aid in meeting OSHA standards.

6. Asbestos: Airborne Danger (OSHA 2075) June 1972

   Pamphlet pointing out the dnngers of inhaled asbestos fibers.

7. The Safe Use of Anhydrous Ammonia (OSHA 2011) Jan. 1972

   Folder describing the injury potential of anhydrous ammonia fertilizer. A section is devoted to accident prevention.

8. Scientific Equipment Aids OSHA Compliance Efforts (OSHA 2049) May 1972

   Pamphlet on the OSHA compliance officer's special equipment used to measure potentially dangerous gases, fumes, vapors, dusts, and noises.

9. How States Plan for Job Safety and Health (OSHA 2050) May 1972

   Booklet briefly commenting on the criteria and standards for State plans for job safety and health.

10. Target Health Hazards (OSHA 2051) June 1972

    Booklet containing facts about five hazardous workplace substances (asbestos, carbon monoxide, cotton dust, lead, and silica) which make up OSHA's Target Health Hazards Program.

11. Careers in Safety and Health: The Occupational Nurse (OSHA 2053) June 1972

    Pamphlet pointing out the need for the occupational nurse and describing her role with OSHA emphasis on healthful jobsite conditions.

12. Noise (OSHA 2067) Aug. 1972

    Pamphlet dealing with noise as a danger to physical and psychological health and explaining OSHA's noise regulations and standards.

13. Guidelines for Setting Up Job Safety and Health Programs (OSHA 2070) Nov. 1972

    Booklet establishing guidelines to help employers develop and implement safety and health programs.

14. Don't Dig Your Own Grave (OSHA Special Emphasis Poster) Mar. 1973

    Special emphasis poster encouraging safer on-the-job practices in trenching, excavating, and backfilling operations.

15. Employer-Employee Safe Practices for Excavation & Trenching Operations (OSHA 2085) Mar. 1973

    Booklet describing OSHA standards for excavation and trenching operations. A reprint of Subpart P, 1926.650, 1926.651, 1926.652, and 1926.653 from the Federal Register is included.

16. Contractor Planning for Job Safety & Health in Excavation, Trenching & Backfilling (OSHA 2086) Mar. 1973

    Pamphlet serving as a guide to contractors responsible for developing and maintaining an accident prevention program for excavating, trenching, and backfilling operations.

17. 15 Questions: Know the Answers, . . Help Prevent Cave-Ins (OSHA 2087) Mar. 1973

    Pamphlet containing answers to 15 questions on excavation and trenching operations that need to be considered in preventing cave-ins.

The Following are Available for Purchase from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

Occupational Safety and Health Act of 1970 PL 91-596 (OSHA 2001) Dec. 1970

Full text of the Act. Single copies are 20¢ each.

Job Safety & Health (Magazine)

OSHA's official monthly magazine reporting on the agency's programs, policies, and standards and on developments and research in safety and health. Also included are news from the National Institute for Occupational Safety and Health, the Review Commission, and a listing of the latest Federal Register insertions. Single copies are 80¢ each. Annual subscriptions are $9.05.

Federal Register

Document published daily, Monday through Friday, providing a uniform system for making available to the public regulations and legal notices issued by federal agencies (including OSHA). Single copies are 75¢ each. Annual subscriptions are $45.

Subscription Service

Service providing all standards, interpretations, regulations, and procedures in easy-to-use loose-leaf form, punched for use in a three-ring binder. All changes and additions will be issued indefinitely. Individual volumes are available at these rates:

I.	General Industry Standards and Interpretations . .	$21.00
II.	Maritime Standards and Interpretations	$ 6.00
III.	Construction Standards and Interpretations	$ 8.00
IV.	Other Regulations and Procedures	$ 5.50
V.	Compliance Operations Manual (availability date to be announced).	$ 8.00

The Principles and Techniques of Mechanical Guarding (OSHA 2057) Nov. 1973

Bulletin outlining the principles of mechanical guarding and containing illustrations showing the techniques as applied to specific machines. Single copies are 90¢ each.

A Handy Reference Guide (OSHA 2004) 1971

Pocket-sized booklet describing the Act, its coverage, purpose, penalties, and other items of interest to employers. Single copies are 20¢ each.

OSHA Regional Offices

Region I

18 Oliver Street
Boston, Mass. 02110
Telephone: (617) 223-6712

Region II

Room 3445, 1 Astor Plaza
1515 Broadway
New York, N.Y. 10036
Telephone: (212) 971-5941

Region III

15220 Gateway Center
3535 Market Street
Philadelphia, Pa. 19104
Telephone: (215) 597-1201

Region IV

1375 Peachtree Street, N.E.
Suite 587
Atlanta, GA. 30309
Telephone: (404) 526-3573

Region V

300 South Wacker Drive
Room 1201
Chicago, Ill. 60606
Telephone: (312) 353-4716

Region VI

Texaco Bldg. - 7th Floor
1512 Commerce Street
Dallas, Tex. 75201
Telephone: (214) 749-2477

Region VII

911 Walnut Street, Room 3000
Kansas City, Mo. 64106
Telephone: (816) 374-5861

Region VIII

Room 15010, Federal Bldg.
1961 Stout Street
Denver, Colo. 80202
Telephone: (303) 837-3883

Region IX

Box 36017
450 Golden Gate Avenue
San Francisco, Calif. 94102
Telephone: (415) 556-0586

Region X

Smith Tower Bldg., Room 1808
506 Second Avenue
Seattle, Wash. 98104
Telephone: (206) 442-5930

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